

REMARKS

By the present amendment, the specification and Abstract have been amended to correct several apparent typographical errors and/or to improve their presentation. Claim 1 has been amended to further clarify the concepts of the present invention and claim 7 has been amended to obviate the examiner's objections thereto. Support for the amendments to claim 1 may be found, among other places, on page 4, lines 32 to 36 of the specification as filed. In addition, claim 2 has been amended to be consistent with amended claim 1 and claims 4 and 5 have been amended to further clarify the concepts of the present invention. Further, independent claim 9 in the form of a product-by-process claim has been added. Entry of these amendments is respectfully requested.

In the Office Action, the specification was objected to as containing numerous grammatical errors, some of which were noted, and revision of the entire specification was requested. In response to this objection, the entire specification has been carefully reviewed, and, as noted above, has been amended to correct apparent typographical errors and/or to improve its presentation.

Claim 7 was rejected under the second paragraph of 35 USC § 112 as being indefinite. In particular, the examiner alleged that the limitation relative to the melting point of this claim was not clear. As noted above, claim 7 has been amended herein to clarify this recitation. Accordingly, withdrawal of the rejection under 35 U.S.C. § 112 is respectfully requested.

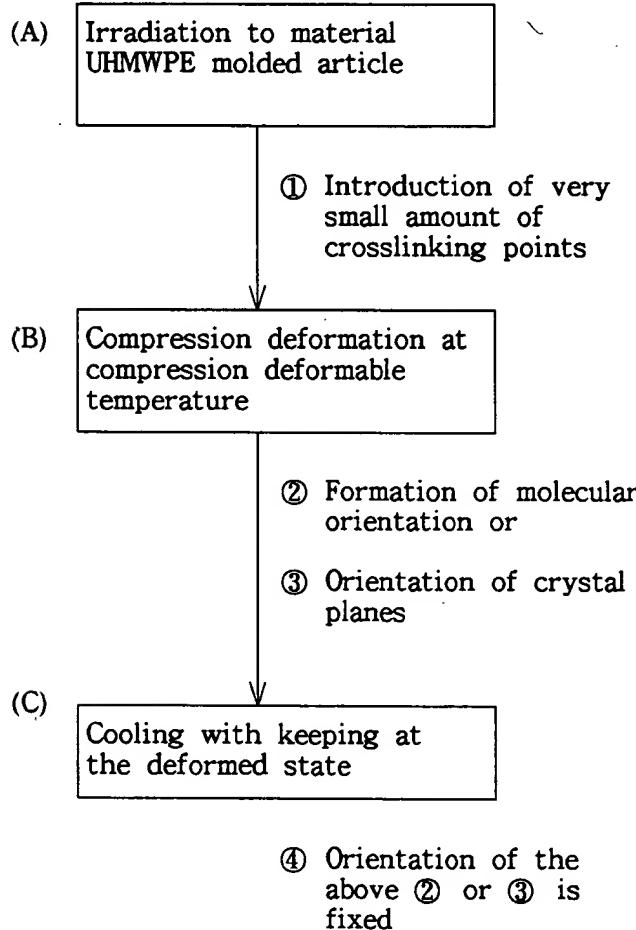
Claims 1-8 were rejected under 35 USC § 102(b) as being anticipated by the patent to Rosenzweig. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

Before discussing the teaching deficiencies of the cited Rosenzweig patent in detail, it is to be specifically noted that independent claim 1 has been amended herein to delete the phrase "molecular orientation" from the claim. While the molecular orientation of articles according to the present invention is essentially different from the products of the Rosenzweig patent since the former is formed by compression and the latter is formed by expansion, superior effects of the articles of the present invention such as an improved abrasion resistance and low friction are achieved mainly by orientation of crystal planes, and the orientation of crystal planes is not obtained in the Rosenzweig patent as explained below. Consequently, independent claim 1 has been amended to delete the phrase "molecular orientation" and to utilize the feature of "orientation of crystal planes" as now contained in the claim to positively distinguish the present invention from the teachings of the Rosenzweig patent.

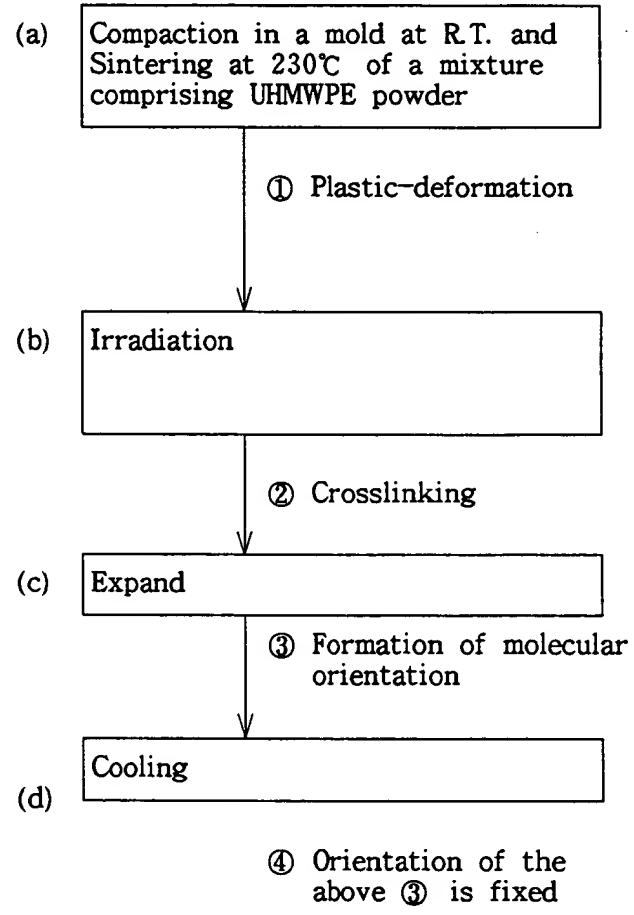
Turning now to the cited Rosenzweig patent, it is an object of this patent to provide a heat-shrinkable product used for joining substrates or pipes for transporting gas and water, for example. In distinct contrast to this object of the Rosenzweig patent, an important object of the present invention is to obtain a product having an improved low abrasion resistance and low friction used for artificial joints implantable in animals.

Comparison of the present invention with the invention of Rosenzweig

The present invention



Rosenzweig



Effect

(A) The article is plastic-deformable under the melting point, but is rubber elastic-deformable in the molten state by introducing crosslinking points before compression deformation.

(B) Molecular orientation or orientation of crystal planes is formed.

(C) Low abrasion resistance and friction are improved because orientation of (B) is fixed.

→ (b) Since crosslinking point are introduced after plastic-deformation, orientation of crystal planes cannot be given.

→ (c) Molecular orientation is formed by expansion. No orientation of crystal planes.

→ (d) The molecular orientation of (c) is fixed, and heat-shrinkability is given.

Furthermore, as noted briefly above, the articles of the present invention and the products according to the Rosenzweig patent are different from each other in a number of important respects. In particular, the attention of the examiner is directed to the attachment herein entitled "Comparison of the present invention with the invention of Rosenzweig" which compares articles of the present invention with the products according to the Rosenzweig patent. Specifically, this attachment illustrates several important differences as set forth in the following:

First, the steps (A) and (B) of the method of making the products according to the present invention are compared with the steps (a) and (b) according to the Rosenzweig patent. In the method of the present invention, a molded article of UHMWPE material is irradiated to introduce a very small amount of crosslinking points before compression deformation in step (A) and then the article is compression deformed in the step (B). To the contrary, according to the Rosenzweig patent, a mixture comprising UHMWPE powder is compacted and sintered through plastic deformation in step (a) and then the compacted and sintered product is irradiated to introduce crosslinking points in step (b).

Second, the steps (A) to (C) of method of the present invention are compared with the steps (b) to (c) according to the Rosenzweig patent. Since the molded article of UHMWPE material according to the present invention is irradiated beforehand in the step (b), the irradiated UHMWPE molded article is compression deformed through rubber elastic deformation in the molten state (at a temperature not less than the melting point) and orientation of crystal planes as well as molecular orientation can be formed in the step (b). In contrast thereto, although the

sintered product in the Rosenzweig patent is irradiated in the step (b) and expanded and molecular orientation can be formed in the step (c), the orientation of crystal planes cannot be obtained by expansion, even if the crosslinking points are introduced in the step (b). Consequently, the molded article according to the present invention as defined by amended independent claim 1 is clearly different from that of the Rosenzweig patent.

The above remarks concerning the teaching deficiencies of the Rosenzweig patent are also applicable to the subject matter set forth in independent claim 5 directed to a method for producing an ultra high molecular weight polyethylene molded article. In Example 1 of the Rosenzweig patent as cited by the examiner, UHMWPE is subjected to 3 Mrad of radiation for cross-linking and then expanded at 120°C (see lines 55-58 of column 14). Among other things, this Example of the patent cited by the examiner utilizes a compression before irradiation to crosslink in contrast to the subject method which irradiates so as to crosslink and then afterwards compresses the material. As is set forth in the first paragraph on page 6 of the subject specification, orientation cannot be accomplished unless the material is first cross-linked slightly by being subjected to irradiation. This distinction as to step sequence relative to the teachings of the Rosenzweig patent has been clarified by the amendments to independent claim 5 herein.

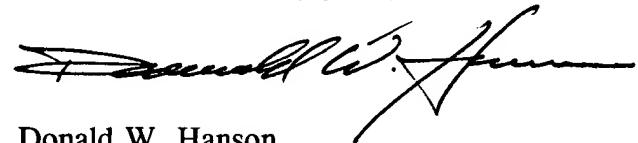
For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103 and allowance of claims 1 through 9 as amended over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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Enclosures: Abstract

Attachment